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The Exact and Approximate Formulas for an Inverse Toeplitz Matrix via Linear Prediction

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Abstract

In this talk, we give an exact expression for the inverse of a finite order positive definite Toeplitz matrix generated by f. The expression is based on the multi-step ahead best linear predictions of the corresponding weakly-stationary time series. Using the method of alternating projections, we can obtain the series expansion of the inverse Toeplitz matrix in terms of the infinite order casual/minimum phase factorization of f. We obtain the approximation bound in the series expansion for both bounded and unbounded f. Some applications in time series and signal processing are to be discussed.